REMARKS

This Amendment, submitted in response to the Office Action dated July 14, 2003, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

As a preliminary matter, the Examiner has objected to the title as non-descriptive. Applicant has amended the title as set forth above.

Claims 1-12 remain pending in the application and have been rejected under 35 U.S.C. § 102 as being unpatentable over Horikawa (U.S.P. 4,754,291) in view of Okino (U.S.P. 5,754,214) and Leksell (U.S.P. 5,025,321). Applicant submits the following arguments in traversal of the prior art rejections.

Applicant's invention relates to a scanning system for a light source. Known scanning systems include semiconductor lasers. The lasers exist in limited emission bandwidths and are further known to show fluctuation in wavelength in view of current injection variation and temperature. Micro-area light emitting devices are available in a wider range of wavelengths but have been observed to exhibit greater sensitivity to electric current variation. Corrections for variation include using fixed electric current, with modulating pulse widths. However, pulse width modulation may cause micro-area light-emitting diodes to be continuously lit depending on tone information, which changes characteristics of the diode due to heating effects.

Applicant's invention obviates this deficiency. Referring to Fig. 3, the CPU 31 inter-operates with respective PWM generators 35R, 35G and 35B, and controls output timing of image data stored in the buffers to the PWM generators. The EELED (edge emitting LED) driving signal is a pulse signal including at least one pulse having a period shorter than a period

for forming an image corresponding to one pixel. Pulses of the EELED driving signals have a constant period and a substantially constant power, and a number thereof within a period for forming an image corresponding to one pixel is determined on the basis of tone information of image data. One of multiple types of EELED driving signals, which include EELED driving signals including no pulse, one pulse, two pulses, . . . or eight pulses, is generated according to tone information of image data. Since the pause is provided between the pulses, the EELEDs are not continuously driven, thereby preventing generation of heat history. In the exemplary embodiment, when scanning is carried out with the EELED driving signals a plurality of dots is recorded in the main-scanning direction, and adjacent dots are exposed so that they are overlapped by about 80% of their diameter.

Turning to the cited art, Horikawa relates to a recording apparatus using combined pulse width and intensity modulation. Since pulse number modulation or pulse width modulation is combined with intensity modulation, it is possible to adjust the change range of scanning light amount to a large value by making up for a small width of pulse number modulation. Therefore, it is possible to quickly record a continuous tone image having a high image quality. The drive current D is fed pulsewise by the drive circuit 11 to the semiconductor laser 10 and the level of the drive current D is changed so that the semiconductor laser 10 pulsewise emits the laser beam 12 having a light emission intensity I1 or a light emission intensity I2. In the embodiment, the ratio of the light emission intensity I1 to the light emission intensity I2 is adjusted to I1/I2=128.

Okino generally relates to an image scanning device.

Leksell relates to a facsimile transmission device using an edge emitting array for both reading and writing. The reference does not relate to microarea LEDs. Referring to Fig. 4, high voltage drive 20 is used as an excitation source for the pixel array. Driver board 21 provides an interface for the signal path to the thin film electroluminescent module 22. A general power supply source 55 is available for all control devices. The control scheme shown in Fig. 4 can be used to selectively activate pixels in the array 1 (Fig. 1). Both primary emissions from an end face and secondary emission from side faces are generated and used in Leskell. Col. 5, lines 49-55.

The Examiner maintains that the references in combination teach each feature of the claims. The Examiner has not taken into account the full teachings of the references in making the rejection. While the Examiner relies on general assertions of purported interchangeability and improved resolution, the references actually conceptually teach away from their combination with each other.

First, Horikawa teaches fluctuations in driving current that impart an intensity ratio of 128:1. Since it has been determined that changes in applied power cause wavelength fluctuations semiconductor devices, and in micro area devices, one skilled in the art would not combine the voltage fluctuations of Horikawa with the micro-area light source features of Leksell.

Second, Applicant would challenge the Examiner's assertion that resolution improvement can be provided by the claimed combination. In particular, the system of Leskell appears to emit a primary light source and also spurious secondary emissions at least obliquely directed towards

the recording surface. Applicant argues that the spurious secondary emissions would tend to create recording artifacts and thereby degrade the resolution. Therefore, the Examiner's proffered reasons for making the combination are not supported. Independent claims 1 and 7 are patentable for at lest these reasons.

With further regard to claim 7, this claim specifically describes a modulator characterized by substantially constant power. The primary reference Horikawa exhibits large current fluctuations to provide large variations in intensity I1, I2. The Examiner's characterization of the large fluctuation corresponding to a constant output is incorrect. Therefore, the primary reference clearly teaches away not only from its combination with Leksell but teaches away from claim 7.

As a related matter, Applicant would submit that one skilled in the art would not modify Horikawa to include the substantially constant power. This is because in the structure of Horikawa, the power fluctuation permits a rapid change in intensity that cannot be achieved by pulse width modulation alone. Removing the power fluctuation in Horikawa would thus undermine the principle of operation of the reference. Therefore, claim 7 is patentable for this additional reasons.

Claims 2-6 and 8-12 are patentable based on their dependency.

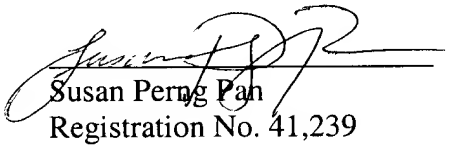
With regard to claims 6 and 12, the acknowledges deficiencies in the art but Examiner cites the interchangeability of R, G, B and C, M Y to reject the claims. This assertion is unwarranted since significant transformations must be made between the two color spaces. Claims 6 and 12 are patentable for this additional reason.

Applicant has added new claims 13-16 to describe feature of the invention more particularly.

In view of the above, Applicant submits that claims 1-16 are in condition for allowance. Therefore it is respectfully requested that the subject application be passed to issue at the earliest possible time. The Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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